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ENCKE'S COMET.

HAMBURG. Equatoreal. (M. C. Rümker.)

1852.	Hamburg M.T.	R.A.	Parx.	Decl.	Parx.	No. of Comps.
	h m s	° ′ ″	″	° ′ ″	″	
Feb. 18	7 43 55·5	0 54 8·7	+4·3	+8 39 58·8	+5·8	10
19	7 20 41·6	1 22 39·6	4·3	8 47 20·3	5·6	7
20	7 11 11·7	1 51 11·4	4·3	8 53 48·7	5·8	17
23	7 17 17·4	3 17 49·8	4·6	9 10 47·7	6·0	20
24	7 17 23·8	3 45 55·6	4·6	9 15 19·6	6·1	9
25	7 49 44·2	4 14 11·1	4·8	9 18 23·0	6·3	4
27	7 5 23·8	5 23 49·6	4·9	9 32 40·1	6·4	5
Mar. 1	7 24 15·5	6 15 55·4	5·3	9 13 43·1	7·0	13
2	7 5 16·4	6 34 46·1	5·5	9 6 58·3	7·1	3
4	7 18 27·6	7 4 31·9	5·7	8 43 25·5	7·4	7
5	7 6 5·2	7 13 50·0	5·9	8 26 31·9	7·7	7
8	7 6 56·5	7 9 52·6	6·3	7 5 56·0	8·2	2
9	7 2 14·6	7 1 36·7	+6·6	+6 45 54·8	+8·7	1

The parallax annexed has not yet been applied. The places of the compared stars have mostly been deduced from the Hamburg meridional observations. See *Monthly Notices*, vol. xii. No. 5.

Apparent Places of the Compared Stars.

	R.A.	Decl.		R.A.	Decl.
	h m s	° ′ ″		h m s	° ′ ″
Jan. 20	23 12 46·56	+4 34 20·8	Feb. 25	0 19 14·06	+9 12 37·9
	14 29·58	4 31 31·7		20 39·46	22 37·8
22	23 20 42·47	5 15 32·2	27	0 21 51·23	9 33 54·5
	55·02	4 59 30·7	Mar. 1	0 26 29·27	9 29 11·4
26	23 22 48·81	5 36 31·1	2	0 26 29·27	9 29 11·4
27	23 22 48·81	5 36 31·0	4	0 29 56·22	8 49 24·5
Feb. 18	0 4 10·52	8 18 51·9		33 32·10	32 39·9
19	0 7 46·09	8 55 35·0	5	0 33 32·09	8 32 39·9
20	Idem.		8	0 36 38·81	6 57 31·5
23	0 12 50·26	9 6 45·0	9	0 40 59·07	+6 46 33·2
24	0 12 50·25	9 6 44·9			
	19 14·06	19 37·9			
	0 20 39·46	+9 22 37·8			

Description of an Eye-piece for viewing the Sun, &c., with Remarks upon the Solar Spots and other Phenomena. By the Rev. W. R. Dawes.*

The principal peculiarity of this eye-piece consists in a metallic slide, with perforations of different sizes, which crosses the eye-tube

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* Mr. Dawes explained the construction of this eye-piece at the meeting, and exhibited drawings of the solar spots as seen by its means. As the memoir will appear in the 4to. volume, a brief abstract is considered sufficient for this place.

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at right angles, just at the focus of the object-glass. There are contrivances, which can easily be imagined, for rapid manipulation, and though the slide is, of course, greatly heated when the sun is viewed, the conduction is cut off by interposing a plate of ivory. The perforations vary in diameter from 0·5 to 0·0075 of an inch, and, with a small field, single lenses are preferred to complicated eye-pieces. Mr. Dawes finds that, in general, apertures which exceed 0·3 inch cannot be safely used for a long time under a hot sun. Where the usual proportions are retained between the aperture and focal length of an object-glass (seldom exceeding 1 to 16 in large telescopes), a focal diaphragm of 0·3 inch transmits a portion of the sun's image, the size and heat of which is nearly equivalent to that of the whole image of the sun in a refractor of 32 inches focal length, and of 2 inches aperture.* This may usually be employed without injury to the dark glasses, and the field is quite large enough for sweeping over the sun's disk in searching for spots or other phenomena. In careful scrutinies, the suitable aperture must be employed. In some very large spots, the nuclei alone may thus be examined, without any disturbance from the bright surface.

"By this mode of observation I have ascertained the existence of a stratum of comparatively faint luminosity, which, as far as I know, has not been previously noticed. For this I would propose the appellation of *the cloudy stratum.* Its appearance gives the impression of considerable depth below the second luminous stratum which forms the *shallow*, or *penumbra*, usually seen round the nucleus of a spot; and from all the examinations I have hitherto made, it seems to me probable that it is not self-luminous, but of such a nature as to absorb a vast quantity of light, and reflect very little. Its faint illumination is rarely uniform, presenting rather a mottled or cloudy surface; and occasionally some small patches are very decidedly more luminous than the rest, though still incomparably less bright than even the stratum forming the penumbra; from which it also differs essentially in being destitute of the striated or ridged appearance so frequently presented in that stratum.

"In all spots of considerable size, and in many small ones, a *black opening* is perceivable in the cloudy stratum. In no instance have I perceived any light in these openings which exceeded the illumination of the earth's atmosphere by the sun's rays. It is obvious that any degree of light inferior to this cannot be rendered visible by any contrivance we can employ; just as the red projections from the sun's border cannot be seen except when the solar illumination of our atmosphere is nearly extinguished by the intervention of the moon. In order to obtain a measure of this illumi-

* In the observations of the solar eclipse of July last, Mr. Lassell found that his dark glasses would bear an aperture of 2 inches, with a focal length of 32·5 inches, after they had been carefully heated over a lamp. With an aperture of 2·55 inches, "the dark glasses broke with most alarming rapidity." At the same place, with a telescope of 42 inches focus and 2·75 aperture, Mr. Williams had dark glasses cracked which had been in frequent use for five years.

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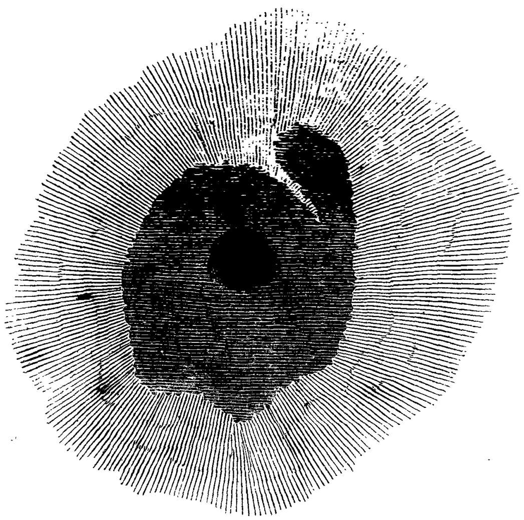
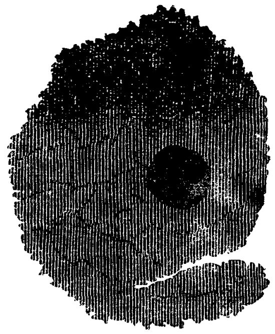
nation of the atmosphere, and to ascertain the limit which it sets to our researches, I have usually directed the telescope, with a very small field, to the sky close to the sun's edge, using the lightest shade of darkening glass which my eye could comfortably bear. Then, using the same shade, the telescope is directed with the smallest diaphragm to the dark part of a large spot. In this way the cloudy stratum will in general become visible, frequently occupying by far the greater part of what has been hitherto considered the *nucleus* of the spot, and imagined to be, in fact, the body of the sun itself. A portion of it, however, will commonly be found to appear perfectly black, whence we may conclude that, if luminous at all, it is less so than our own atmosphere when illuminated by the direct rays of the sun. To this black part only the appellation of *nucleus* appears to be strictly applicable." See the figure below marked January 17, which consists of the penumbra, the cloudy stratum, and the true nucleus.

A remarkable instance of *rotatory* motion was observed in a spot which was sketched on January 17 and January 23.

Jan. 17.



Jan. 23.



The rotation was not of the smaller round the larger portion. "*The whole spot had rotated round the small black nucleus.*"

On examining the surface of the sun carefully, using a very small field, Mr. Dawes is persuaded that "the apparent rapid fluctuation of the porous structure is not real, but the effect of disturbance in our own atmosphere."

Mr. Dawes states his conviction of the superiority of large apertures with high powers in viewing the sun, which this reduction of the field makes easy. The *faculæ*, too, are seen far better with large apertures, especially when the power is not proportionally high.

"These are best seen near the east and west edges of the sun's disk, where they give the impression of narrow ridges, whose sides are there presented to view. They usually lie nearly in the direc-

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tion of a circle of latitude on the sun's surface, and are rarely high enough to be seen as actual projections from his limb. On one occasion, however, the 22d of January last, I had an opportunity of observing a satisfactory confirmation of the idea that they are ridges, or heapings up of the luminous matter; and as the requisite circumstances are extremely rare, I will advert more particularly to the observation. A large bright streak, or *facula*, was observed to run, as usual, nearly parallel to the sun's edge for some distance, and very near it; and then to turn rather abruptly towards the edge and pass over it. The limb was at times very well defined; and when it was most sharp and steady, the bright streak was seen to *project slightly beyond the smooth outline of the limb*, in the manner of a mountain ridge nearly parallel to the sun's equator."

This eye-piece was applied to Mr. Lassell's 20-foot reflector last September, and the sun was examined with the whole of the 24-inch mirror. The eye-piece did not become more than sensibly warm after two hours' exposure to a bright sun.

Mr. Dawes points out the utility of this contrivance in examining the surface of the moon, in observing the occultations of small stars, and the eclipses of *Jupiter's* satellites, and in observing or detecting the faint satellites of planets. By such means, too, *Venus* and *Mercury* may be more pleasantly observed when near the sun; and as the author remarks, "to the practised observer such applications will readily occur," and need not be here insisted on.

Mr. Dawes' eye-piece was constructed by Mr. Dollond according to Mr. Dawes' directions.

Micrometrical Measurements of the Binary Star ξ Ursæ Majoris, and the Double Star Struve 1263, made at the Observatory, Whitehaven. By J. F. Miller, F.R.S.

ξ Ursæ Majoris. Magnitudes, 4,5; 5,5. Colours, both white.

Reference.	Position.	Weight.	No. of Obs.	Distance.	Weight.	No. of Obs.	Epoch.
	° ′			″			
63	122 11	3	9	2·883	3	8	1852·066
66	122 35	3	8	2·859	3	8	·076
67	123 5	1	7				·112
68	122 27	3	8	2·886	2	6	·133
70	122 22	3	8	2·867	2	8	·136
75	121 41	3	8	2·912	3	8	·161
77				2·944	3	9	·169
80	122 16	4	8	2·935	2	5	·180
Means	122 17	20	56	2·898	18	52	1852·129

63. Jan. 24, 1852. Distances between clouds. This is only the third clear night we have had since Dec. 23, 1851.

67. Encke's comet seen at 7 P.M. Midnight; stars dance perpetually, and definition bad; no dependence can be placed upon this set of positions.